

AN ANALYSIS OF THE EFFECT OF LIVELIHOOD DIVERSIFICATION ON THE FOOD SECURITY STATUS OF THE RURAL FARMING HOUSEHOLDS IN UDI L.G.A OF ENUGU STATE

ONUNKA, CYNTHIA. N¹ & OLUMBA, CHUKWUDI. C²

¹Department of Agricultural Economics, University of Nigeria, Nsukka, Enugu State, Nigeria

²Department of Agricultural Economics, Management and Extension, Ebonyi State University Abakaliki, Nigeria

ABSTRACT

Diversification of livelihoods is a recurrently applied approach for cushioning economic and environmental shocks on the path to improving food security. Therefore, this study was conducted to empirically analyse the effect of livelihood diversification, on the food security status of the rural farming households. The study was conducted in Udi local government area, Enugu state, Nigeria. The study drew a sample of 60 rural households through a multi-stage random sampling technique. Data obtained were analysed using food security index, tobit regression model and Pearson Product Moment Correlation. The two-third mean per capital monthly food expenditure (food security line) for the entire household was ₦1,430.18. More than half (55%) of the sampled households were food insecure. The tobit regression result indicated that the household size, farm size, gender, age and dependency ratio were found to have significant effect in determining diversification of the farming households livelihood sources. The Pearson Product Moment Correlation coefficient obtained for the diversification index (0.61) was positive and significant at 1 percent level of probability. Policy implications were drawn for birth control, poverty alleviation programs which would enhance their livelihood diversification activities, and the creation of sustainable off-farm and non-farm employment opportunities.

KEYWORDS: Food Security, Rural Farming Households, Livelihood Diversification & Determinants

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INTRODUCTION

Food is a basic need and necessity of life that must be given top priority amongst every other developmental issue. Food intake in appropriate proportion and good nutritive value is key for a productive and healthy living, hence the need for food security. Food security is deemed to exist when all people have consistent access to safe, quality and adequate food resources to meet their dietary requirement and food preferences for a healthy and active life (Pinstrup-Anderson, 2009). Food insecurity, the converse situation is said to exist when there is uncertainty in the ability to acquire nutritionally adequate and safe foods in socially acceptable ways (Gillespie *et al.*, 2001).

Nigeria like other developing countries relies on the agricultural sector as the backbone of her economy. Nigeria's agricultural sector is the principal source of food and livelihood for her ever-growing populace. However, the sector is characterized by primitive agriculture and over-reliance on rain-fed agriculture, which has resulted to the poor performance of the sector (Phillip *et al.*, 2009). Given that the majority of the rural Nigeria

households are largely dependent directly or indirectly on agriculture for their food and livelihood needs (Liverpool-Tasieet *al.*, 2011), the poor performance of the sector creates food availability and accessibility problems for the households, thereby, putting them at high risk of unbalanced nutrition, limited access to food and overall food insecurity. Orewa and Iyangbe (2010) corroborate this, when they mentioned that as much as 71% of rural households in Nigeria are food insecure, and such households have constrained physical and economic capacity, to maintain their present level of well-being. Therefore, the dire need for the vulnerable rural households, to adopt actions aimed at expanding their income streams, in order to meet their food and livelihood demands.

Consequently, livelihood diversification of the rural dwellers has become a subject of conceptual and policy-based research and at the forefront in discussions for rural poverty alleviation and food security in low income developing countries. In simple terms, livelihood diversification can be described as attempts by people to device other ways to promote their income level and reduce their vulnerability to different livelihood shocks. According to Khatun and Roy (2012), livelihood diversification attempts could either be through diversification into agricultural related activities e.g production of agri-foods or cash crops or into non-agricultural enterprises (e.g engaging in casual jobs or migration). Scholars have put into light the prospect of the livelihood diversification attempts by rural dwellers as a means of improving their food security (Tashikalma, *et al.*, 2015). Hence, this study sought to analyse the effect of livelihood diversification, on the food security status of the rural farming households. The result of this study will fill literature gap needed to make progress, in transforming the food and nutrition security of the rural Nigeria dwellers. The study findings will inform policy makers, for designing appropriate policies that can mitigate food insecurity in rural Nigeria.

Objectives of the Study

Specifically, this study was designed to:

- Determine the food security status of the rural farming households;
- Identify and evaluate the determinants of livelihood diversification among the rural farming households in the study area; and
- Analyse the effects of livelihood diversification on food security status of the farmers in the study area.

Study Hypotheses

The hypotheses underlying this research is stated as follows:

- **H₀:** There is no significant relationship between livelihood diversification and socio-economic characteristics of farmers in the study area.
- **H₀:** Livelihood diversification has no significant effect on food security status of farmers in the study area.

METHODOLOGY

Study Area

The research was carried out in Udi local government area (LGA) in Enugu state, Nigeria. The population census held in 2006, puts the population of the Udi local government at 238,305, comprising 117,914 males and 120,391 females (National Population Commission, 2006). The local government has 17 communities with each of these communities comprising of villages.

Owing to the endowment of good soil that supports agricultural production, the major economic activity of the people of Udi LGA includes subsistence farming (crop and livestock production) and palm wine tapping. In terms of livestock rearing, the people rear mostly poultry and small ruminants. Major food crops grown in the study area include cassava, sweet potatoes, plantain, banana, cowpeas, vegetables, melon, pineapples and maize. The people speak mostly the Igbo language (Emerole *et al.*, 2014).

Sampling Procedure

The population for the study comprised of all rural households in Udi local government area. A multi-stage random sampling technique was used to select the sample for the study. This sampling strategy was adopted to ensure equal chances of selecting each unit from the population being studied. The first stage involved the random selection of 10 communities out of the 17 communities in the study area. In the next stage one village from each the 10 selected communities were randomly selected. In the final stage 6 households were randomly selected from each of the 10 selected villages. This gave a sample size of 60 rural households.

To achieve randomisation of the sample, at the first stage, for example, the names of the 17 communities in the study area were listed and assigned consecutive numbers (1 to 17). Then a random number table was used to generate a list of random numbers. The random numbers generated were then matched to the communities they represented on the list. Such communities identified were therefore selected. This same process of randomisation was done at the second and last stage.

Analytical Techniques

Descriptive statistics, food security index and tobit regression model were the analytical techniques employed in the data analysis. Specifically, objective I was analysed using Food Security Index, and objective II was analysed using the Tobit regression model. While, Pearson Product Moment Correlation (PPMC) was used to analyse objective III. The statistical package, STATA (version 15) was used for the statistical analyses. All information about respondents and the results of analysis were presented using tables.

Food Security Index: The food security status of the respondents was estimated by adapting Household food expenditure methods which has found wider application in several empirical studies (Ifeoma and Agwu, 2014; Arene and Anyaeji 2010). The method entails constructing a food security index (Z_i), which is then used to estimate the food security line for the rural households in the study area. The food security index (Z_i) is given by:

$$Z_i = \frac{\text{Per capita food expenditure for the } i\text{th household}}{2/3 \text{ mean per capita food expenditure of all households}}$$

Where Z_i = food security index (when $Z_i \geq 1$ = food secure i th household, $Z_i \leq 1$ = food insecure i th household).

Hence the food security line, required for considering a household as food secure or insecure was estimated as two-third of the mean per capita monthly expenditure of all households. Thus, a food secure household is one whose per capita monthly food expenditure is greater or equal to two-third of the mean per capita food expenditure. On the other hand, a food insecure household is one whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure. Additionally, the headcount ratio of food security was computed for the sample households based on the food security index (Z) estimated. The headcount ratio (H) shows the percentage of food insecure/secure

households.

The head count index is specified as:

$$\text{Headcount Index } (H_{fi}) = \frac{M}{N}$$

N

$$\text{Headcount Index } (H_{fis}) = \frac{L}{N}$$

N

Where:

M = number of food insecure households; L = number of food secure households

N = total number of households

Tobit Regression Model: Determinants of livelihood diversification was analysed at the farming household level. It was targeted at evaluating the effect of numerous socio-economic factors on the extent of livelihood diversification adopted by each household. According to Schwarze (2004), since the dependent variable is bounded between 0 and 1 (i.e the variables are censored at 0.0 and 1.0), conventional regression methods fail to take into account the qualitative difference between zero and continuous observations. Furthermore, Rhaji (2000) opined that, Tobit model combines the properties of multiple regression and Probit/Logit model. Therefore Tobit model which was initially established for censored data was applied for the analysis. The model is specified as:

$$Y_i = \beta X_i \text{ if } i^* = \beta X_i + u_i > T_i \quad (1)$$

$$Y_i = \beta_0 + \beta_i X_i + u_i \quad (2)$$

Where:

u_i = normally distributed with zero mean and constant variance

X_i = vector of explanatory variables

β_i = vector of the parameter estimates

Y_i = Livelihood diversification index obtained by dividing the number of livelihood sources employed by all the livelihood sources available in the study area. Thus the value of the livelihood diversification index ranges between zero (0) and one (1). Thus the explanatory variables used in the analysis are:

X_1 = Household size (number of persons in the household)

X_2 = Household head monthly income (₦)

X_3 = Credit access (Yes = 1, No = 0)

X_4 = Farm size (hectares)

X_5 = Membership of cooperative (Yes = 1, No = 0)

X_6 = Gender of household head (Male = 1; Female = 0)

X_7 = Dependency ratio

X_8 = Age of household head (years)

RESULTS AND DISCUSSIONS

Livelihood Diversification Activities of the Rural Farming Households

As expected of a typical rural area, majority (96.7%) of the respondents took to farming as a means of ensuring their daily bread. The table 1 further shows that 45% of them were involved in trading and 40% were artisans. Other livelihood activities observed in the area included various paid labour, motorcycling, locally known as “okada rider” and employment into civil service of which accounted for 28.3%, 25% and 18.3%, respectively. This finding of a combined range of activities engaged in by the rural households, as a means of earning livelihood is in agreement with the observation of the works of Dercon and Krishanan, (1996); Ellis, (2000); Unni, (1996) cited in Khatun D. and B.C. Roy, (2012). They noted that, in recent times the rural dwellers no longer restrict themselves to crop and livestock- rearing activities, but rather are involved in a diverse portfolio of activities.

Table 1: Distribution of Respondents by their Livelihood Diversification Activities

Livelihood Activities	Frequency	Percentage
Farming	58	96.7
Trading	27	45
Artisan	24	40
Paid labour	17	28.3
Okada	15	25
Civil Service	11	18.3

Source: Field Survey, 2017

Multiple Responses

Food Security Status of the Households

Households were profiled into food secure and food insecure groups, based on their per capita monthly food expenditure, which was used to draw the food security line. The food security line is defined as two-third of the mean per capita food expenditure of the total households studied. Table 2 presents the summary of food security indices of the sampled rural households.

Table 2: Summary of the Food Security Indices of the Households

Food security Indices	Food secure	Food insecure	Total
Frequency	25	35	60
Percentage	41.67	58.33	100
Head count ratio	0.42	0.58	-
2/3 Mean per capita food expenditure (Food security line) equals ₦1430.181			

Source: Field survey (2017)

The monthly mean per capita food expenditure for the total households was ₦2145.27. The two-third mean monthly per capital food expenditure (food security line) was ₦1430.181. Therefore, households whose per capita monthly food expenditure fall below ₦1430.181 were classified food insecure, while households whose per capita monthly food expenditure equals or is greater than ₦1430.181 were classified food secure. From table 2, it is observed that more than half (58.33%) of the households were food insecure. The headcount ratio, for the food insecure households (0.58) was greater than that of the food secure households (0.42), thus establishing the presence of food insecurity in the area. This finding is similar to the study findings of Omotesho et al., (2006) and Ifeoma and Awgu (2014), who found the prevalence of food insecurity among rural households in Nigeria.

Determinants of Livelihood Diversification among the Respondents in the Study Area

The determinants of farm household livelihood diversification practices were identified using censored regression model of eight explanatory variables. The result in Table 3 revealed that sigma was 0.3289 and statistically significant at 5 percent. This shows that the model is of good fit to the data. Also four out of the eight variables were statistically significant at 1% and 5% and 10 % levels of probability.

Table 3: Maximum Likelihood Estimates of Tobit Regression for Households Livelihood Diversification

Explanatory Variables	Coefficient	Standard Error	T value	P> t
Household size	.0992***	.0347	2.86	0.006
Household income	-1.96e-06	5.61e-06	-0.35	0.729
Access to Credit	-.0881	.1432	-0.62	0.541
Farm size	-.1064**	.0511	-2.08	0.042
Member of cooperatives	.1297	.1180	1.10	0.277
Gender	-.2860**	.1279	-2.24	0.030
Age	-.0070*	.0043	-1.64	0.108
Dependency ratio	-.0614*	.0314	-1.96	0.056
Constant	.7121	.3034	2.35	0.023
/sigma	.3289	.0468		
Log likelihood = -28.031572				
LR Chi-square (8) = 15.59				
Prob> Chi-square= 0.0486**				

*Significant at 10% **Significant at 5% ***Significant at 1%

Source: Computer analysis of Tobit Regression model, 2017

The result further shows that the decision to diversify from agriculture to other livelihood means was positively influenced by household size and negatively influenced by farm size, gender, age and dependency ratio.

The coefficient of household size been positively signed and highly significant at 1 % implies that an increase in the number of household members will in turn, increase the livelihood diversification practiced by 10 %. Extra money will be required to cater for the increasing household membership, thus, the need for various additional income sources to meet their numerous demands. This result is similar to that reported by Babatunde (2009) who noted that, increase in household size may increase labour availability, which will make it easier for the household to let some members engage in off-farm and other income generating activities.

The coefficient of farm size is -0.106 and was significant at 5 % which means that, farmer's engagement in livelihood diversification will be reduced by 11 %. The implication is that, a hectare increase in farm size will reduce the livelihood diversification practiced by 11 %. The negative coefficient of farm size agrees with results of studies, earlier reported by Adebayo, Akogwu, and Yisa, (2012) that, as farm size increases, it will in turn, generate additional income, if all things being equal; conversely a farming household is likely to reduce other non-farm activities.

The coefficient of gender (-0.286) was negative and significant at 5 % implying that, households headed by males have a lower level of livelihood diversification than their female counterparts. Specifically, being a male headed household decreases the level of diversification by 29 %. Sava *et al.*, (2015) had similar observation while accessing the determinants of income diversification among rural households. It further implies that more women diverse their income than males in order to reduce variability in household income which is perceived to be generated from the net farm income.

The coefficient of age (-0.007) is significant at 10 % and negatively related to involvement in numerous

livelihood activities implying that with advancement in age of household heads, their involvement in non-agricultural activities reduces by 0.007. Corroborating this was the finding of Lemi (2006), and it was found that, farmers' participation in income diversification decreased as their age increases.

The dependency ratio has a negative and significant influence on farmers' livelihood diversification. An addition of one more dependent family member will decrease the probability of the farmer's engagement in livelihood diversification by 6 %. The logic behind this might be that an increase in dependency ratio, leads to shortage of working hands to earn from diversified activities to fulfil the household needs. This means an increase in the number of household members below 15 and above 64 years, who are unable to engage themselves in some activities, affects livelihood diversification negatively. Dilruba and Roy (2012), has also found negative relationship between number of dependent ratio and livelihood diversification activities.

Based on the findings of this study, the hypothesis which states that, there is no significant relationship between livelihood diversification and socio-economic characteristics of farmers is rejected while the alternative hypothesis which states that, there is significant relationship between livelihood diversification and socio-economic characteristics of farmers is accepted.

Effect of Livelihood Diversification on Food Security Status of the Farmers in the Study Area

The Pearson correlation analysis result presented in Table 4 revealed that there is significant relationship between livelihood diversification and food security status of the farmers.

The coefficient obtained for the diversification index (0.61) was positive and significant at 1 percent level of probability. This implies that as livelihood diversification increases, food security status of the respondents also increases. Livelihood diversification has been reported to cause a significant increase in total household livelihood, which would, in turn, increase household food security status. This result is similar to that of Echebiri, Onwusiribe and Nwaogu (2017) who found that food security among farming households was influenced by livelihood diversification strategies. It is therefore worthy to note that livelihood diversified households are more food secured than the converse households. The higher the correlation coefficient, the better the degree of co-movement between livelihood diversification and food security of the farmers. Hence, the higher the level of livelihood diversification *ceteris paribus*, the higher the food security status is expected to be.

Table 4: Relationship between Livelihood Diversification and Food Security Status of the Rural Farming Households

Variable	r	P-Value	Decision
Livelihood diversification level vs Food security status of the rural Farming Households	0.61	0.000	significant

r = correlation coefficient, p- probability level of significance $p < 0.01$ (significant)

Source: Field Survey, 2017

Based on the findings of this study, the hypothesis which states that livelihood diversification has no effect on food security status of the rural farming households is rejected while the hypothesis which states that livelihood diversification has effect on food security status of the rural farming households is accepted.

CONCLUSIONS AND POLICY IMPLICATIONS

There is a need for policy makers and other related actors to recognise the potentiality and effectiveness of livelihood diversification in the overall scheme of rural poverty reduction. In this way the attainment of improved standard of living and food security of the rural households especially in low income countries can be met with much success. This study posits livelihood diversification as a positive step in arresting the menace of poverty plaguing the rural areas. This is because it expands the income sources of the rural people and provides a form of insurance to households during times of food insufficiency. Thereby putting them at less risk to hunger, malnutrition, diseases and sudden deaths that accompany food insecurity situations.

The Tobit model result shows that from out of eight (8) hypothesized variables about four (4) variables were found as significant determinants of different livelihood diversification activities in the study area. As the result, farm size, gender, age and dependency ratio have significant and negative relationship with participation in diversified activities, while household size has positive and significant relationship. The results of the study further revealed a statistical significant relationship between livelihood diversification of the farming households and their food security status. By implication, livelihood diversified households are more food secured than the converse households. Hence, the higher the level of livelihood diversification *ceteris paribus*, the higher the food security status is expected to be.

Based on these findings, the following policy implications of the study stand out:

- Aggressive awareness campaigns and rural development programs need to encourage the participation in other income generating ventures apart from farming to enhance their income and break the vicious cycle of impoverishment.
- Infrastructural facilities that can stimulate good business environment should also be made available. So that diversification of means of livelihood will be more profitable to better food security of the rural households. It is imperative that access to the income generating ventures to be implemented are sustainable since this variable has a positive relationship with their food security status.
- In view of the fact that farming is the main economic base in the area under study, the state government should enact appropriate policies to promote the potentials of farming households. Such households should be provided with agricultural inputs such as improved planting materials and fertilizers at affordable rates.
- Soft loans at reduced interest prices should be made available and accessible to farming households so that they are encouraged to scale up their production. Hence, boosting their productivity and income level and consequently their food security status.
- Due to time constraints, the research was conducted with a limited sample size. Therefore, undertaking this study on an extensive scale is a useful avenue for future research.

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